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IS : 12419 (Part 1) - 1988
(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR RADIO FREQUENCY CONNECTORS OF SMA, SMB AND SMC SERIES

PART 1 TEST SCHEDULE AND REQUIREMENTS

UDC 621·316·541·029·421·53 : 621·38·038

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NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR RADIO FREQUENCY CONNECTORS OF SMA, SMB AND SMC SERIES

PART I TEST SCHEDULE AND REQUIREMENTS

0. FOREWORD

0.1 This Indian Standard (Part 1) was adopted by the Bureau of Indian Standards on 25 April 1988, after the draft finalized by Connectors for Electronic Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 This standard is one of the series of Indian Standards on radio frequency connectors for frequencies above 3 MHz used in electronic equipment and shall be read in conjunction with IS : 5054-1988*.

0.3 This standard is the sectional specification covering SMA, SMB and SMC series of connectors. Subsequent parts of this standard would cover detail specifications for specific types of connectors.

0.4 While preparing this standard, assistance has been derived from JSS 52405 'Detail specification for connectors, radio frequency, series SMA, SMB and SMC' issued by the Directorate of Standardization, Ministry of Defence, India.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

*Rules for rounding off numerical values (*revised*).

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1. SCOPE

1.1 This standard (Part 1) specifies the test schedule and requirements applicable for radio frequency connectors of SMA, SMB and SMC series.

2. TERMINOLOGY

2.1 For the purpose of this standard, the terms and definitions given in IS : 1885 (Part 40)-1974* and IS : 5054-1988† shall apply.

3. MATERIALS, CONSTRUCTION AND WORKMANSHIP

3.1 The construction and workmanship shall be in accordance with **4** of IS : 5054-1988†. The materials and finish shall be in accordance with the relevant specification.

4. TYPE DESIGNATION

4.1 Radio frequency connectors of series N, according to this standard, shall be designated by:

a) reference to this Indian Standard,

b) the letters IS representing Indian Standard,

c) A two-digit numerical block to identify various families of connectors.

For example : SMA family in the block No. 01 to 30,
SMB family in the block No. 31 to 60,
SMC family in the block No. 61 to 90, and
block No. 91 to 99 reserved as spares.

d) a two-digit numerical block number varying from 01 to 99 for each type of connector to represent variants like materials, finishes, cables, cable terminating technique applications, etc. This block is further subdivided into two blocks, one block between numbers 01 to 49 to idenify connectors for professional applications and the other block of numbers between 50 to 99 to identify connectors for consumer applications.

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*Electrotechnical vocabulary : Part 40 Connectors.

†General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

4.2 The type designation shall be given in accordance with **4.1**, for example:

XXXX IS-01-50

where

XXXX — represents the reference number of this standard,

IS — represents Indian Standard,

01 — represents a connector of SMA family, and

51 — represents that the connector is for consumer applications.

4.3 The type designations shall be specified in the relevant detail specification.

5. MARKING

5.1 The connectors shall be marked in accordance with **6** of IS : 5054-1988*.

6. PACKAGING

6.1 The connector shall be suitably packed to withstand normal handling and transit hazards.

6.2 Packing (preservation, identification and packaging) shall be in accordance with the terms of the contract.

7. CLIMATIC CATEGORY

7.1 The climatic category shall generally be according to **3** of IS : 5054-1988*.

8. ELECTRICAL CHARACTERISTICS

8.1 The electrical characteristics of connectors shall be as specified in the relevant detail specification.

9. TESTS

9.1 General — The test schedule specifies the tests and the order in which they shall be carried out as well as the requirements to be met.

9.2 Conditions of Tests — The provisions of **8** of IS : 5054-1988* shall apply.

9.3 Classification of Tests — The provisions of **7** of IS : 5054-1988* shall apply.

9.4 Test Schedule

9.4.1 *Type Tests* — The test schedule for type tests and the sequence of tests shall be as specified in Table 1. The manufacturers shall submit 22 mating pairs of each style for which approval is desired. If approval is desired for all types covered in any particular category, the manufacturer shall submit 5 mating pairs in each of the remaining types of the particular category. The additional samples shall be subjected of Group 5 tests only.

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*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

TABLE 1 SCHEDULE OF TYPE TESTS

Sl No.	Tests	Cl Ref of IS : 5054-1988*	Conditions of Test	Requirements
(1)	(2)	(3)	(4)	(5)
i)	*Zero Group (22 Pairs)*			
	a) Visual examination	9.1.1	—	—
	b) Dimensions and mass	9.2	—	—
	c) Mating characteristics	11.15	The following details shall be as specified in the relevant detail specification a) Oversize pin or test ring b) Number of insertions c) Insertion force d) Withdrawal force	—
	d) Engagement and disengagement force	11.16	—	—
	1) Bayonet and threaded patterns	11.16.1	—	The torque and longitudinal force shall be specified in the relevant specification

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

(*Continued*)

TABLE 1 SCHEDULE OF TYPE TESTS — *Contd*

Sl No.	Tests	Cl Ref of IS : 5054-1988*	Conditions of Test	Requirements
(1)	(2)	(3)	(4)	(5)
	2) Push-on patterns	11.16.2	—	The force shall not exceed that given in relevant detail specification
	e) Strength of coupling mechanism	11.11	The value of torque shall be specified in the relevant specification	—
	f) Permeability of non-magnetic materials	10.10	—	—
	g) Contact resistance	10.3	—	The value shall not exceed that specified in the relevant detail specification
	h) Voltage proof	10.6	*See* relevant specification	—
	j) Insulation resistance	10.5	500 ± 50 Vdc	The value shall be not less than 500 MΩ for professional grade and 1000 MΩ for consumer grade
	k) Sealing (applicable to sealed patterns)	12.5	For hermetically sealed patterns as in IS : 9000 (Part 15/Sec 5)-1982†	The leakage rate shall not exceed 10^{-8} Pa dm^3/s at atmospheric pressure
			For pressurised patterns, the connectors shall be subjected to the air pressure specified in detail specification applied to one end and the whole assembly immersed in water. The connector shall remain immersed for at least 2 minutes	There shall be no leakage as detected by escaping air bubbles
ii)	*First Group (6 Pairs)*			
	a) Dimensions		—	Interface dimensions shall be applicable as given in Fig. 1 to 4
	b) Solderability (applicable for solder terminations only)	11.2	—	—
	c) Robustness of terminations (applicable for receptacles only)	11.7.3	A steady force of 8·9 N shall be applied to the termination in the direction radial to the axis of the contact which is most likely to cause damage	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

†Basic environmental testing procedures for electronic and electrical items: Part 15 Sealing test, Section 5 Sealing tracer gas (helium) method with mass spectrometer.

(*Continued*)

TABLE 1 SCHEDULE OF TYPE TESTS — *Contd*

SL No. (1)	TESTS (2)	CL REF OF IS : 5054-1988* (3)	CONDITIONS OF TEST (4)	REQUIREMENTS (5)
	d) Bump (Impact)	11.13	4 000 bumps for professional grade and 1 000 bumps for consumer grade. One number in each sense of three mutually perpendicular directions shall be tested	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	e) Vibration	11.3	For professional grade 10 to 2 000 Hz. For consumer grade 10 to 500 Hz	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	f) Shock	11.14	For professional grade 1 km/s^2. Test not applicable for	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	g) Acceleration	11.4	Professional grade 170 m/s^2. Test not applicable for consumer grade	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	h) Rapid change of temperature	12.4	5 cycles of minimum and maximum temperature	—
	1) Visual examination	9.1	—	—
	2) Voltage proof	10.6	[*See* (i) (h)]	*See* (i) (h)
	3) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	j) Climatic sequence	12.2	—	—
	1) Dry heat	12.2.1	At the maximum temperature severity	—
	Visual examination	9.1	—	—
	2) Damp heat cyclic (first cycle)	12.2.2	One cycle	—
	Visual examination	9.1	—	—
	3) Dry cold	12.2.3	At the minimum temperature severity	—

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*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

(*Continued*)

TABLE 1 SCHEDULE OF TYPE TESTS — *Contd*

Sl No.	Tests	Cl Ref of IS : 5054-1988*	Conditions of Test	Requirements
(1)	(2)	(3)	(4)	(5)
	Visual examination	9.1	—	—
	4) Corona level	10.9	The test voltage and air pressure shall be specified in relevant specification	—
	5) Low air pressure	12.2.4	4·4 kPa for professional grade. Test not applicable to consumer grade	—
	Voltage proof	10.6	At 125 Vac	—
	6) Damp heat cyclic (remaining cycles)	12.2.5	For professional grade 5 cycles and for consumer grade 1 cycle	—
	i) Visual examination	9.1	—	—
	ii) Working test	10.11	At the rated voltage	—
	iii) Insulation resistance	10.5	[*See* (i) (j)]	The value shall be 500 MΩ (*Min*) for professional grade, 50 MΩ (*Min*) for consumer grade
	iv) Voltage proof	10.6	*See* (i) (h)	*See* (i) (h)
	v) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	vi) Sealing	12.5	*See* (i) (k)	*See* (i) (k)
	vii) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
	k) Flammability	17	—	Burning particles shall not detach from the RF connectors
iii)	*Second Group (4 Pairs)*			
	a) Damp heat (steady state)	12.3	For professional grade 56 days. For consumer grade 21 days.	—
	1) Visual examination	9.1	—	—
	2) Working test	10.3	At the rated voltage	—
	3) Insulation resistance	10.5	*See* (i) (j)	The value shall be 500 MΩ (*Min*) for professional grade, 50 MΩ (*Min*) for consumer grade
	4) Voltage proof	10.6	*See* (i) (h)	*See* (i) (h)
	5) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	6) Sealing	12.5	*See* (i) (k)	*See* (i) (k)
	7) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
iv)	*Third Group (4 Pairs)*			
	a) Mechanical endurance	13	The number of operations shall be 500, at the rate of 12 operations/min, *Max*	—

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

(*Continued*)

TABLE 1 SCHEDULE OF TYPE TESTS — *Contd*

SL No.	TESTS	CL REF OF IS : 5054-1988*	CONDITIONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)	(5)
	1) Visual examination	9.1	—	—
	2) Mating characteristics	11.15	*See* (i) (c)	*See* (i) (c)
	3) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
	b) Electrical endurance	14	1 000 h at upper category temperature. The contact shall be loaded at 1 A dc	—
	1) Visual examination	9.1	—	—
	2) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	3) Voltage proof	10.6	*See* (i) (h)	*See* (i) (h)
	4) Sealing	12.5	*See* (i) (k)	*See* (i) (k)
v)	*Fourth Group (1 Pair)*			
	a) Mould growth	12.6	Applicable for professional grades. Test not applicable for consumer grades	—
vi)	*Fifth Group (3 Pairs)*			
	a) VSWR	10.12	—	—
	b) RF Leakage	10.13	—	—
	c) RF Insertion loss	10.14	—	—
	d) Voltage proof (radio frequency)	10.15	—	—
	e) Cable retention force	11.17	—	—
	f) Coupling mechanism retention force	11.18	—	—
	g) Resistance to solvents	16	One of the solvents to be used 1) One part by volume of isopropyl alcohol and 3 parts by volume of mineral spirits 2) Trichloroethane 3) Azeotrope or trichlorofluoroethane (freon) and methylene chloride	—
	1) Insulation	10.5	*See* (i) (j)	The value shall be 500 MΩ (*Min*) for professional grade and 50 MΩ (*Min*) for consumer grade
	2) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
vii)	*Sixth Group (2 Pairs)*			
	a) Centre contact captivation	11.6	—	—
	1) Visual examination	9.1	—	—
	b) Salt mist	12.7	For professional grade duration of exposure 48 hours. Humidity 95 to 98 percent. Test not applicable for consumer grade	—
	1) Visual examination	9.1	—	—
	2) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
	3) Voltage proof	10.6	*See* (i) (h)	*See* (i) (h)
	4) Insulation resistance	10.5	*See* (i) (j)	The value shall be greater than 1 000 MΩ

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

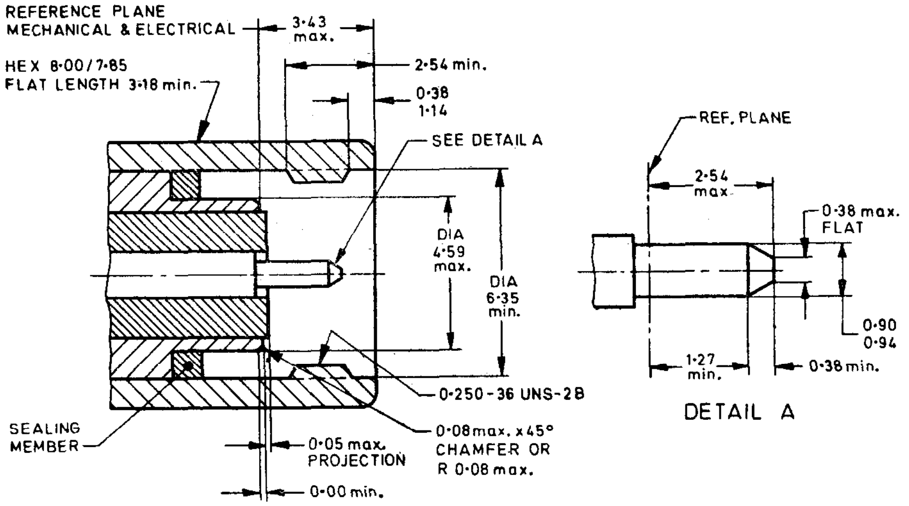
(*Continued*)

TABLE 1 SCHEDULE OF TYPE TESTS — *Contd*

SL NO.	TESTS	CL REF OF IS : 5054-1988*	CONDITIONS OF TEST	REQUIREMENTS
(1)	(2)	(3)	(4)	(5)
	5) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)
	6) Sealing	12.5	*See* (i) (k)	*See* (i)(k)
	c) Dust	12.9	Applicable for professional grade connectors only. Test not applicable for consumer grade	
	1) Visual examination		—	—
	2) Engagement and disengagement force	11.16	*See* (i) (d)	*See* (i) (d)
	3) Contact resistance	10.3	Measurement shall be made on centre contact only	*See* (i) (g)

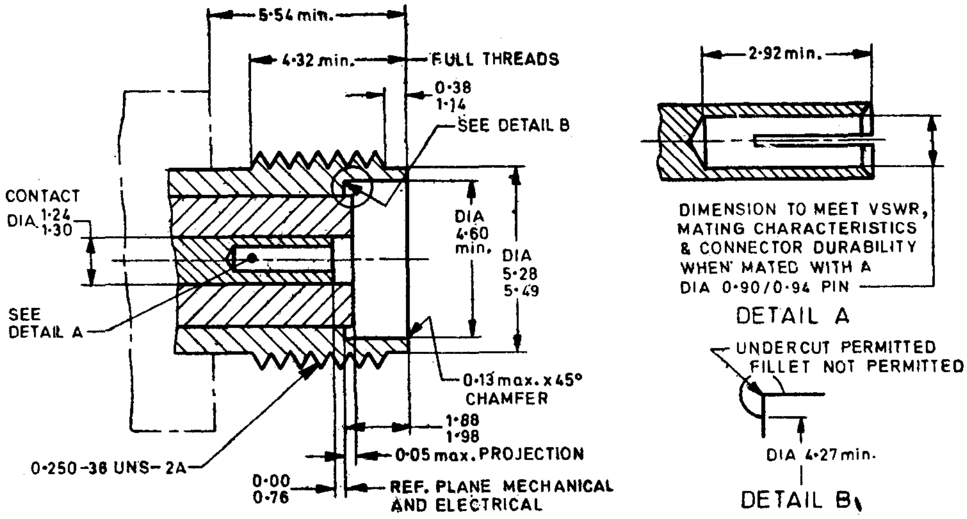
NOTE — Samples shall be checked for materials/finish as specified and shall meet the requirements indicated.

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).



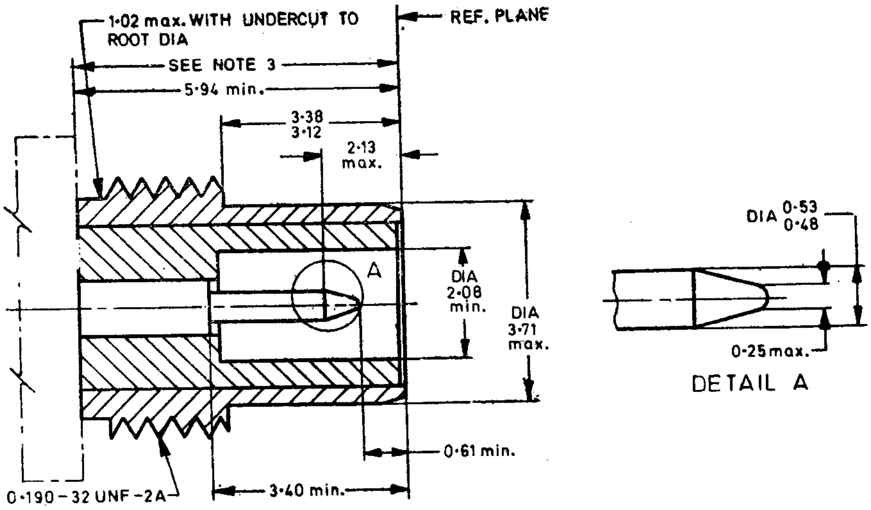
All dimensions in millimetres.

FIG. 1 MATING DIMENSIONS FOR MALE CONTACTS — SERIES SMA



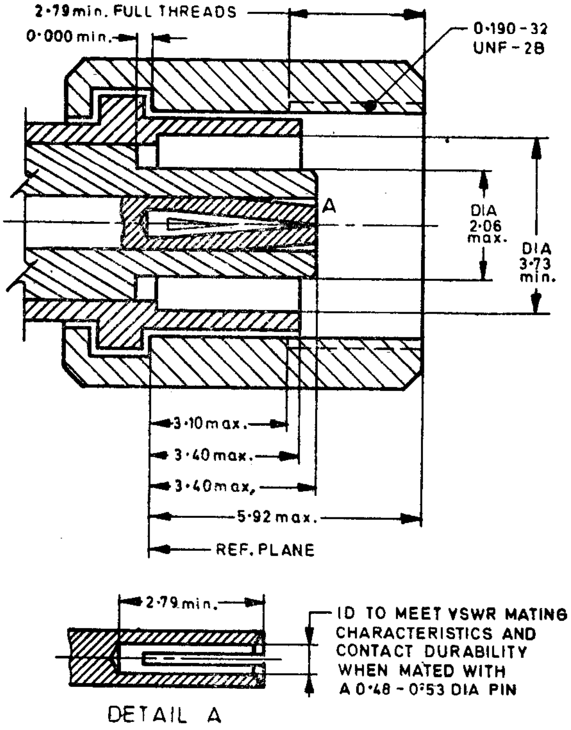
All dimensions in millimetres.

FIG. 2 MATING DIMENSIONS FOR FEMALE CONTACTS — SERIES SMA



All dimensions in millimetres.

FIG. 3 MATING DIMENSIONS FOR MALE CONTACTS — SERIES SMC



All dimensions in millimetres.

FIG. 4 MATING DIMENSIONS FOR FEMALE CONTACTS — SERIES SMC

9.4.2 *Routine Tests* — The following tests shall be carried out in the order stated:

a) Visual examination (*see* **9.1** of IS : 5054-1988*)

b) Voltage proof (Duration 2 seconds, *see* **10.6** of IS : 5054-1988*)

9.4.3 *Acceptance Tests* — Two groups of samples (Group A and Group B) shall be selected, preferably at random from the lot that has passed routine tests stated in **9.4.2** above. Each group of connectors shall be subjected to the tests in order given in Table 2.

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*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

TABLE 2 SCHEDULE OF ACCEPTANCE TEST

(*Clause* 9.4.3)

TESTS	CL REF OF IS : 5054-1988*	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL IS : 10673-1983†	D/ND ‡
Group A				
Dimensions	9.2	I	II	ND
Mating characteristics	11.15			
Engagement and disengagement force	11.16			
Contact resistance	10.3			
Insulation resistance	10.5			
Sealing (for sealed type only)	12.5			
Group B				
Sub-group 1				
Mechanical endurance test (25% of total number of operations)	13	4	S3	ND
Electrical endurance test (168 hours)	14			
Sub-group 2				
Solderability	11.2	4	S3	ND
Rubustness of termination	11.7			
Bump	11.3			
Climatic sequence	12.2			
Sub-group 3§				
Resistance to solvents	16			
VSWR	11.12			
Salt mist	12.7			
Sub-group 4				
Materials and finish 2 samples shall be checked for materials and finish irrespective of the lot size				

*General requirements and methods of tests for radio frequency connectors above 3 MHz (*second revision*).

†Sampling plans and procedures for inspection by attributes for electronic item.

‡Destructive and ND-non destructive.

§Three samples shall be supplied to the test irrespective of lot size and one of more failures shall constitute rejection of lot.

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